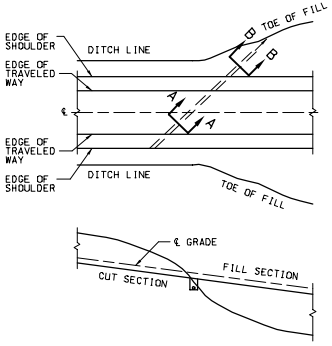
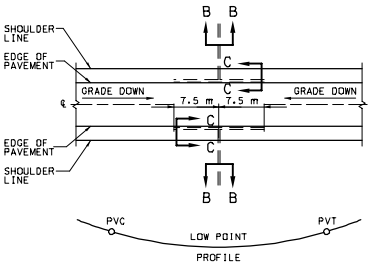


LOCATION ON
TANGENT ALIGNMENT



ON SUPERELEVATED CURVES PLACE LONGITUDINAL UNDERDRAIN ON LOW SIDE ONLY.

CONSTRUCT UNDERDRAINS AT LOW POINT AS SHOWN WHEN EITHER TANGENT GRADE EXCEEDS 2%.

WHEN BOTH TANGENT GRADES ARE 2% OR LESS. OMIT UNDERDRAINS.

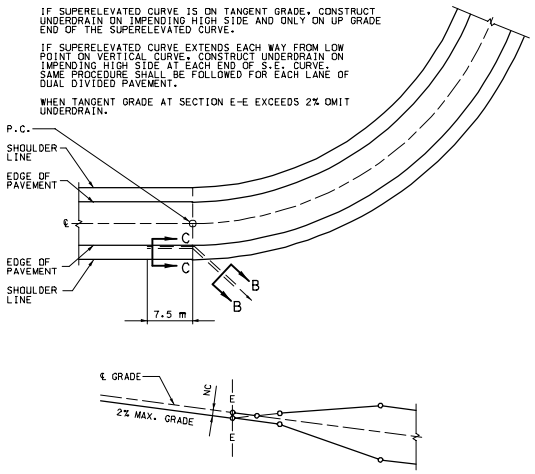
LOCATION IN SAG
VERTICAL CURVES (1)

SECTION E-E INDICATES LAST CROWN SECTION ADJACENT TO SUPERELEVATED CURVE.

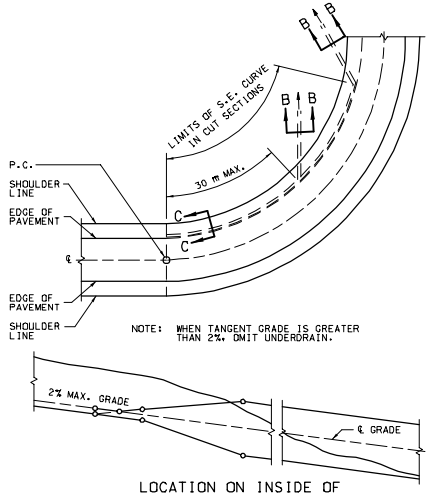
IF SUPERELEVATED CURVE IS ON TANGENT GRADE, CONSTRUCT UNDERDRAIN ON IMPENDING HIGH SIDE AND ONLY ON UP GRADE END OF THE SUPERELEVATED CURVE.

IF SUPERELEVATED CURVE EXTENDS EACH WAY FROM LOW POINT ON VERTICAL CURVE, CONSTRUCT UNDERDRAIN ON IMPENDING HIGH SIDE AT EACH END OF S.E. CURVE. SAME PROCEDURE SHALL BE FOLLOWED FOR EACH LANE OF DUAL DIVIDED PAVEMENT.

WHEN TANGENT GRADE AT SECTION E-E EXCEEDS 2% OMIT UNDERDRAIN.



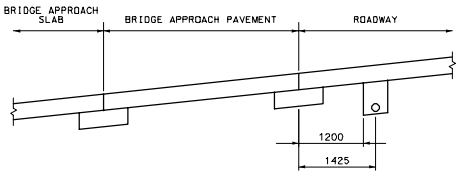
LOCATION ON OUTSIDE OF
SUPERELEVATED CURVES (1)



NOTE: WHEN TANGENT GRADE IS GREATER THAN 2%, OMIT UNDERDRAIN.

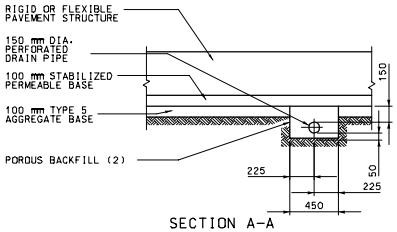
LOCATION ON INSIDE OF
SUPERELEVATED CURVES IN CUT (1)

(1) DRAIN USED ONLY IN ABSENCE OF PIPE AGGREGATE EDGE DRAINS.

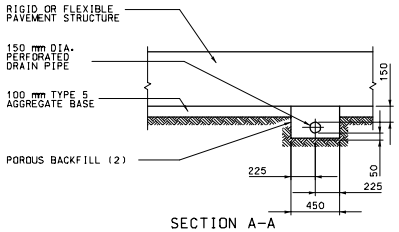


NOTE: OMIT UNDERDRAIN ON POSITIVE GRADE APPROACHING BRIDGE.

LOCATION AT
BRIDGE APPROACHES

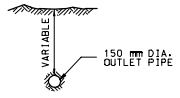


SECTION A-A
WITH PERMEABLE BASE

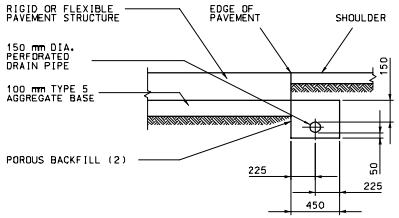


SECTION A-A
WITHOUT PERMEABLE BASE

(2) IF SAND IS USED AS BACKFILL MATERIAL, THE PERFORATED PIPE SHALL BE WRAPPED WITH A TYPE 1 GEOTEXTILE FABRIC. IN ALL OTHER CASES THE ENTIRE TRENCH AND BACKFILL SHALL BE WRAPPED WITH A TYPE 1 GEOTEXTILE FABRIC AND LAPPED 300 mm ON TOP.



SECTION B-B



SECTION C-C

CLASS A UNDERDRAINS

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

TRENCHING PLACEMENT AND BACKFILL OF UNDERDRAINS SHALL BE PERFORMED ONLY AFTER TYPE 5 BASE IS PLACED AND COMPACTED.

POROUS BACKFILL OF TRANSVERSE UNDERDRAINS SHALL EXTEND A MINIMUM DISTANCE OF SHOULDER LINE TO SHOULDER LINE OF FLEXIBLE PAVEMENTS AND A MINIMUM OF 450 mm OUTSIDE OF EACH EDGE OF RIGID PAVEMENT SLABS.

ALL UNDERDRAIN PIPE WITHIN POROUS BACKFILL SHALL BE LAID WITH PERFORATIONS DOWN.

ALL UNDERDRAIN PIPE OUTSIDE LIMITS OF POROUS BACKFILL SHALL BE LAID WITH PERFORATIONS UP AND COVERED WITH TWO LAYERS OF TAR PAPER PRIOR TO PLACING EARTH BACKFILL OR SHALL BE UNDERDRAIN PIPE THAT IS NOT PERFORATED.

WHERE NECESSARY, POROUS BACKFILL SHALL BE EXTENDED PAST THE MINIMUM LIMITS TO COMPLETELY ENCLOSE ALL PIPE LAID WITH PERFORATIONS DOWN.

ONE LAYER OF TAR PAPER SHALL BE PLACED OVER THE TOP OF ALL POROUS BACKFILL WHICH IS NOT DIRECTLY UNDER THE PAVEMENT SUBBASE.

ALL UNDERDRAIN PIPE SHALL SLOPE TOWARD OUTLET AT A MINIMUM RATE OF 25 mm PER 3.0 m.

OUTLET OF UNDERDRAIN PIPE CUTS SHALL BE A MINIMUM OF 150 mm ABOVE BOTTOM OF DITCH.

OUTLETS OF UNDERDRAIN PIPE IN FILLS SHALL EXTEND THROUGH SIDE OF FILL.

REGARDLESS OF THE DEPTH SHOWN ON THE PLANS, UNDERDRAINS SHALL BE SET DOWN INTO ANY IMPERVIOUS LAYER SO AS TO DEFINITELY INTERCEPT SEEPAGE.

POROUS BACKFILL SHALL BE PONDED WITH WATER IMMEDIATELY BEFORE COVERING TO EFFECT MAXIMUM SETTLEMENT OF THE BACKFILL MATERIAL.

MAXIMUM LENGTH OF UNDERDRAIN PIPE BETWEEN OUTLETS SHALL BE APPROXIMATELY 30 m.

THE SKETCHES SHOWN ON THIS SHEET ARE NOT DRAWN TO SCALE AND ARE ONLY INTENDED AS A GENERAL GUIDE FOR PLACING AND CONSTRUCTING UNDERDRAINS. THE ACTUAL LOCATION AND CONSTRUCTION SHALL BE AS DIRECTED BY THE ENGINEER.

THE PLAN DEPTH USED FOR THE PURPOSE OF PAYMENT FOR UNDERDRAINS NOT SHOW ON THE PLANS SHALL BE 450 mm.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

PAVEMENT UNDERDRAINAGE

DATE:_____ | EFFECTIVE:01-01-2001 | M605.10D | 1/2

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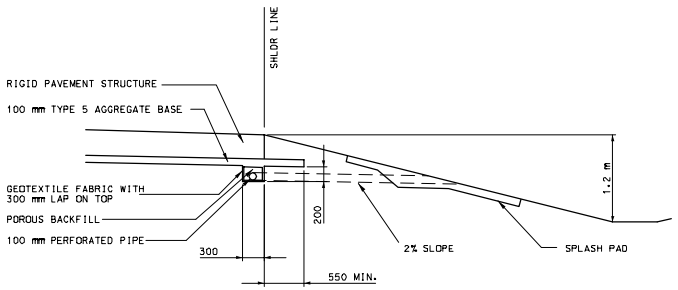
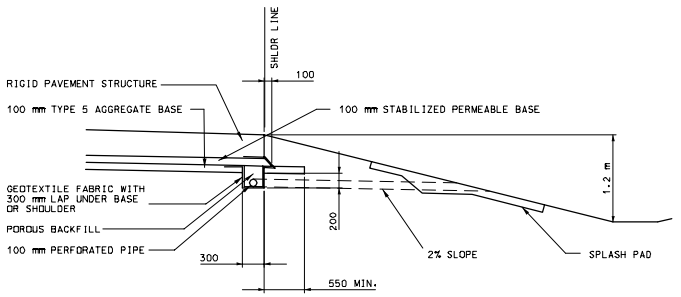
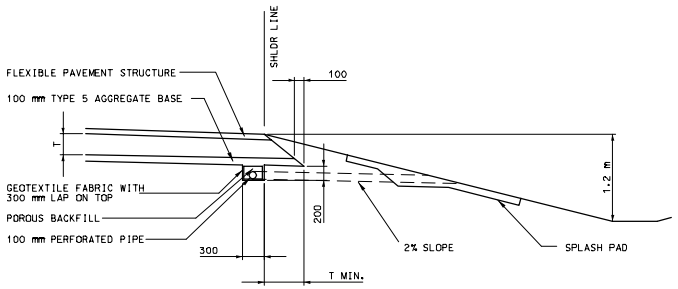
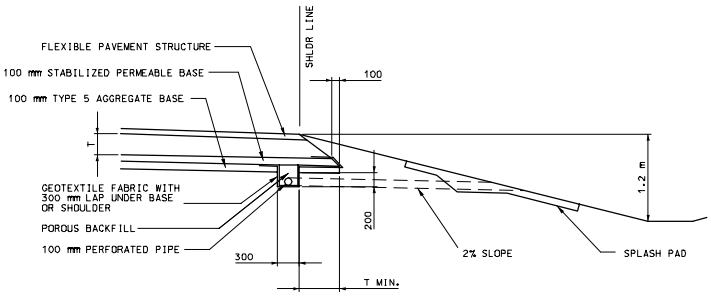




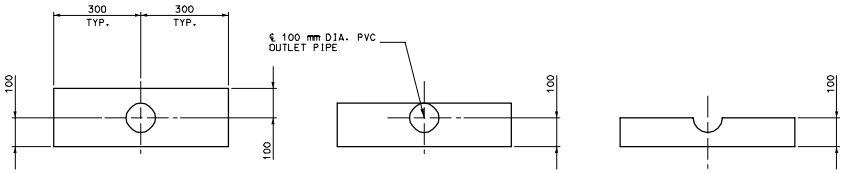




MEDIUM DUTY

HEAVY DUTY

PIPE – AGGREGATE PAVEMENT UNDERDRAINS



SECTION A–A

SECTION B–B

SECTION C–C

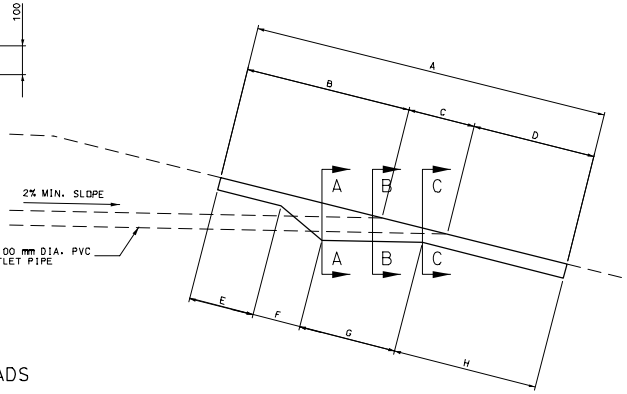
ITEM	1:2	1:3	1:4	1:6
A	1644	1857	2085	2574
B	810	921	1038	1284
C	234	336	447	690
D	600	600	600	600
E	600	600	600	600
F	138	183	234	354
G	213	321	438	681
H	693	753	813	939
CONC.	0.11 m³	0.13 m³	0.15 m³	0.19 m³

NOTE:

PRECAST CONCRETE SPLASH PADS MAY BE INSTALLED AS APPROVED BY THE ENGINEER.

TOP OF SPLASH PAD SHALL MATCH EXISITING CROSS SLOPE. CONSTRUCT BEND IN SPLASH PAD WHERE CROSS SLOPE CHANGES.

DIMENSIONS ARE APPROXIMATE AND CAN BE ADJUSTED AS DIRECTED BY THE ENGINEER.



CONCRETE SPLASH PADS

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

ALL EDGE DRAIN PIPE WITHIN POROUS BACKFILL SHALL BE LAID WITH PERFORATIONS DOWN.

OUTLET OF EDGE DRAIN PIPE IN CUTS SHALL BE A MINIMUM OF 150 mm ABOVE BOTTOM OF DITCH.

OUTLETS OF EDGE DRAIN PIPE IN FILLS SHALL EXTEND THROUGH SIDE OF FILL.

REGARDLESS OF THE DEPTH SHOWN ON THE PLANS, EDGE DRAINS SHALL BE SET DOWN INTO ANY IMPERVIOUS LAYER SO AS TO DEFINITELY INTERCEPT SEEPAGE.

POROUS BACKFILL SHALL BE PONDED WITH WATER IMMEDIATELY BEFORE COVERING TO EFFECT MAXIMUM SETTLEMENT OF THE BACKFILL MATERIAL.

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

PAVEMENT UNDERDRAINAGE

DATE:_____ | EFFECTIVE: 01-01-2001 | M605.10D | 2/2